

2 minute Warm-up!

1. $\log_4 16 = 2$

2. $\log_4 64 = 3$

3. $\log_3 9 = 2$

4. $\log_3 \frac{1}{3} = -1$

5. $\log_2 32 = 5$
 $2^5 = 32$

6. $\log_2 4 = 2$

7. $\log_5 \frac{1}{25} = -2$
 $5^{-2} = \frac{1}{5^2} = \frac{1}{25}$

8. $6^{\log_6 32} = 32$

9. $\log_4 x < 2$
 $4^2 > x$
 $0 < x < 16$

10. $\log_2 x > 3$
 $2^3 < x$
 $x > 8$

10-3
Properties of Logs

$$b > 0 \quad b \neq 1$$
$$m > 0 \quad n > 0$$

1. $\log_b m \cdot n = \log_b m + \log_b n$

2. $\log_b m/n = \log_b m - \log_b n$

* 3. $\log_b m^p = p \cdot \log_b m$

Simplify.

ex

$$2\log_{10} 5 + \log_{10} 4$$
$$\log_{10} 5^2 + \log_{10} 4$$
$$\log_{10} 100$$
$$\textcircled{2}$$

ex

$$2\log_3 6 - \log_3 4$$
$$\log_3 36 - \log_3 4$$
$$\log_3 9$$
$$\textcircled{2}$$

ex

$$\log_4 40 - \log_4 5$$
$$\log_4 8 = y$$
$$4^y = 8$$
$$2^{2y} = 2^3$$
$$y = \textcircled{\frac{3}{2}}$$

ex

$$\log_4 3 - \log_4 48$$

$$\log_4 \frac{3}{48}$$

$$\log_4 \frac{1}{16}$$

$$(-2)$$

ex Expand

$$\log_6 m^2 n^3$$

$$\log_6 m^2 + \log_6 n^3$$

$$2 \log_6 m + 3 \log_6 n$$

ex Expand

$$\log_4 \sqrt{\frac{m}{n^5}} = \log_4 \left(\frac{m}{n^5} \right)^{\frac{1}{2}}$$

$$\frac{1}{2} \log_4 \left(\frac{m}{n^5} \right)$$

$$\frac{1}{2} [\log_4 m - 5 \log_4 n]$$

Solve.

ex

$$\log_5 x = 3 \log_5 2 + \log_5 7$$

$$\log_5 x = \log_5 2^3 + \log_5 7$$

$$\log_5 x = \log_5 56$$

$$x = 56$$

Solve.

ex

$$\log_3 x = 2 \log_3 3 + \log_3 5$$

$$x = 45$$

Solve.

ex

$$\log_b (x+3) = \log_b 8 - \log_b 2$$

$$= \log_b 4$$

$$x+3=4$$

$$x=1$$

Solve.

ex

$$\log_7(x+1) + \log_7(x-5) = 1$$

★ $\log_7(x+1)(x-5) = 1$
 $\log_7(x^2 - 4x - 5) = 1$
 $7^1 = x^2 - 4x - 5$
 $0 = x^2 - 4x - 12$
 $(x-6)(x+2)$
 $x=6$ $x=-2$

Given:

$$\log_3 7 \approx 1.7712$$

$$\log_3 2 \approx 0.6310$$

$$\log_3 3^p = p$$

ex

$$\log_3 54$$

$\log_3 3^3 \cdot 2$
 $\log_3 3^3 + \log_3 2$
 $3 + 0.6310$
 3.6310

54
 \wedge
 9 6
 $\wedge \quad \wedge$
 3 3 3 2
 $3^3 \cdot 2$

ex

$$\log_3 .25$$

$\log_3 \frac{1}{4} \rightarrow \log_3 1 - \log_3 2^2$
 $\log_3 2^{-2}$
 $-2 \log_3 2$
 $-2(.6310)$
 -1.2620

Given:

$$\log_3 7 \approx 1.7712$$

$$\log_3 2 \approx 0.6310$$

$$\log_3 3^p = p$$

ex

$$\log_3 9/49$$

$\log_3 9 - \log_3 49$
 $\log_3 3^2 - \log_3 7^2$
 $2 - 2 \log_3 7$
 $2 - 2(1.7712)$

Given:

$$\log_3 7 \approx 1.7712$$

$$\log_3 2 \approx 0.6310$$

$$\log_3 3^p = p$$

ex

$$\log_3 7/2$$

Given:

$$\log_3 7 \approx 1.7712$$

$$\log_3 2 \approx 0.6310$$

$$\log_3 3^p = p$$

ex

$$\log_3 18$$

Given:

$$\log_3 7 \approx 1.7712$$

$$\log_3 2 \approx 0.6310$$

$$\log_3 3^p = p$$

ex

$$\log_3 2/3$$

Given:

$$\log_3 7 \approx 1.7712$$

$$\log_3 2 \approx 0.6310$$

$$\log_3 3^p = p$$

HW

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